**Doctorate Title:**
Design, modelling and control of a hybrid legged-wheel robot with applications in rescue tasks

**Abstract:**
Robots with real-time and remote network control capability by human operators are playing increasingly important roles in hazardous or challenging environments and areas. Human lives may be exposed to greater risk such as conducting maintenance and repair in nuclear contaminated areas. Although enormous research has been conducted in developing all different types of robots with capacity of sensing, locomotion, and manipulation for various applications, current robots are facing challenges not only in rescue and recovery operations such as the nuclear disaster in Japan in March 2011, but also interaction and cooperation with humans. The development of a remote controllable and autonomous mobile robot which can support humans to conduct rescue and recovery operations in the risky environment is an urgent and complex task.

This project aims to investigate the challenges and prospects of autonomous mobile robots in rescue and recovery operations in hazardous environments/rough terrains. Practically the project will design and develop an autonomous legged-wheeled robot with intelligent path-planning and behaviour-based control system. For travelling on the uneven, difficult and rough terrain, a legged robot is the best option. For the even ground which the robot is required to move fast and efficiently, a wheeled robot is the best option. The proposed hybrid legged-wheeled robot will have both capabilities. The hybrid robot has the ability to determine which motion mode to be used based on the task and environment.

**Keywords:**
Design, Modelling, Control, Underactuated Robot System.

**Publications related to the subject:**


